

**PETROLOGICAL AND MINERALOGICAL
CLASSIFICATION OF THE ISTIFANE CHONDRITES
(MOROCCO)**

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Introduction: The first Istifane meteorite (Istifane 001a) was found in April 2005 about 20 km west of Tinghir, in southeast Morocco [1]. The other five Samples were recovered during geological field work in Tinghir areas of Quarzazate Department in July 2005 (Istifane 001b and 001c), August 2005 (Istifane 002 and Istifane 003) and Mai 2006 (Istifane 004).

Analytical methods: Macroscopic and microscopic observations, scanning electron microscope (SEM) equipped with a pentafet-detector for energy dispersive analysis (EDS) and X-ray diffraction data show that these meteorites are composed of olivine, clino- and orthopyroxene, wollastonite, feldspar and opaque minerals (Fe-Ni alloy, and sulphide).

Result and discussion: All the six meteorites show chemical and petrographic features that are characteristic of ordinary chondrites. The olivine compositions of Istifane 001a, 001b, 001c, 002 and 004 well into the range of typical H-group chondrites, with average of $Fa_{18.4}$, $Fa_{18.8}$, $Fa_{19.2}$, $Fa_{15.5}$, and $Fa_{19.1}$ respectively. Olivine in Istifane 003 has an average of $Fa_{24.9}$ typical for L-group chondrites. Low-Ca pyroxene in Istifane 001a, 001b, 001c, 002 and 004 have average ferrosilite contents of $Fs_{16.2}$, $Fs_{16.4}$, $Fs_{17.5}$, $Fs_{16.8}$, and $Fs_{15.4}$ respectively, typical of H-group chondrites, whereas low-Ca pyroxene in Istifane 003 has a higher average of $Fs_{21.4}$, well within the L-group chondrites.

The Istifane 001a, 001b and 001c are a weakly shocked (shock stage S3) H-group chondrite of petrologic type 4 and weathering grade W4, whereas Istifane AM 005 is a very weakly shocked (S2) H-group chondrite of petrologic type 5 and weathering category W2. Istifane 002 is a strongly shocked (S5) H-group chondrite of petrologic type 5 and weathering category W3 and Istifane 003 as a weakly shocked (S3) L-group chondrite of petrologic type 5 and weathering category W2. Istifane 001a, 001b and 001c belong to the same chemical class and petrologic type. They exhibit the same composition of olivine and pyroxene and show almost identical degrees of shock metamorphism and weathering. For these reasons and due to optical similarities in hand specimen and thin section, pairing of these samples is probable. They are declared, at the meteoritical society, under the name of Istifane 001.

Istifane area (Tinghir, Morocco) has not been good prospected, and probably many individual meteorites are still in place. However, the discovery of these meteorites in Istifane area let us think that the area can be a potential search area.

Polished thin sections and a type specimen of each meteorite are preserved in the collection of the Petrology, Mineralogy and Materials Laboratory (*LPMM*) at the Ibn Zohr University Agadir of Morocco.

References: [1] El Mansouri M., Ibhi A., Nachit H., Ait Touchent A., 2006. Discovery of a group of meteorites in the Istifane area (Tinghir, Morocco): potential search area (abstract). *Meteoritics & Planetary Science* 41, A205.